

Flight Scientist Report  
Tuesday 03/09/2021 ACTIVATE RF52

Flight Type: Statistical Survey Flight (cloudy)

Flight Route: KLF1 KECG OXANA 3245N07145W OXANA KECG KLF1

Special Notes: This day had low clouds to the southeast and so we flew in clear air a while to/from that cloud edge in order to get contrast of cloudy and clear conditions, and to compare these data to yesterday's cold air outbreak flight in the same general area.

### **King Air**

Pilot report (Glenn Jamison): HU-25 was a bit further in trail on SE leg out of ECG due to front-side airspeed calibration efforts; remained in trail until reestablished on NW return leg, where aircraft remained in close proximity up the track. No other significant observations from the flight.

Flight scientist report (Shane Seaman): RF052 (3/9/2021) on the UC12 was a statistical survey joint flight with the HU25 Falcon. The UC-12 took off from KLF1 approx. 0858 EST, and executed "Plan A" flying: KLF1 KECG OXANA 3245N07145W OXANA KECG KLF1. There were multiple different aerosol layers with appreciable depolarization in some of them throughout the flight. Mixing of layers was observed and location relayed to the Falcon. There was a brief detection of burning near the end of the flight, likely due to a fire at the Great Dismal Swamp. A total of 4 sondes were dropped. Shane Seaman was the operator for HSRL-2, RSP, and the cameras. Claire Robinson operated the sondes.

**All instruments operated nominally.**

### **Falcon**

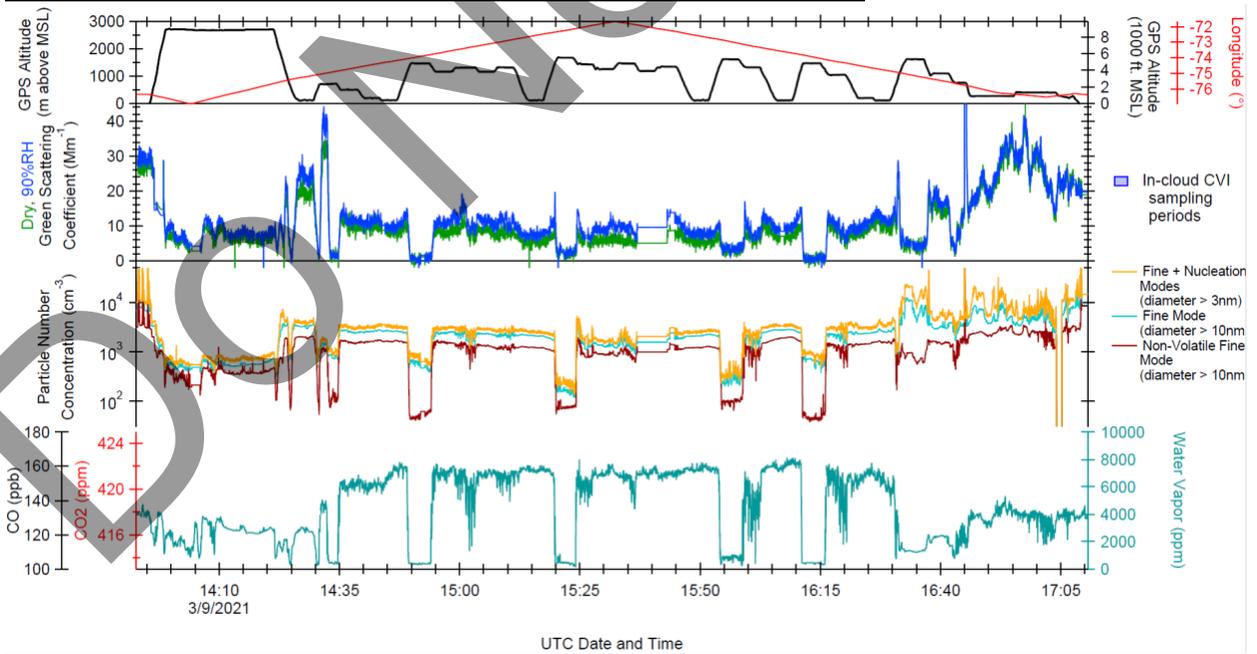
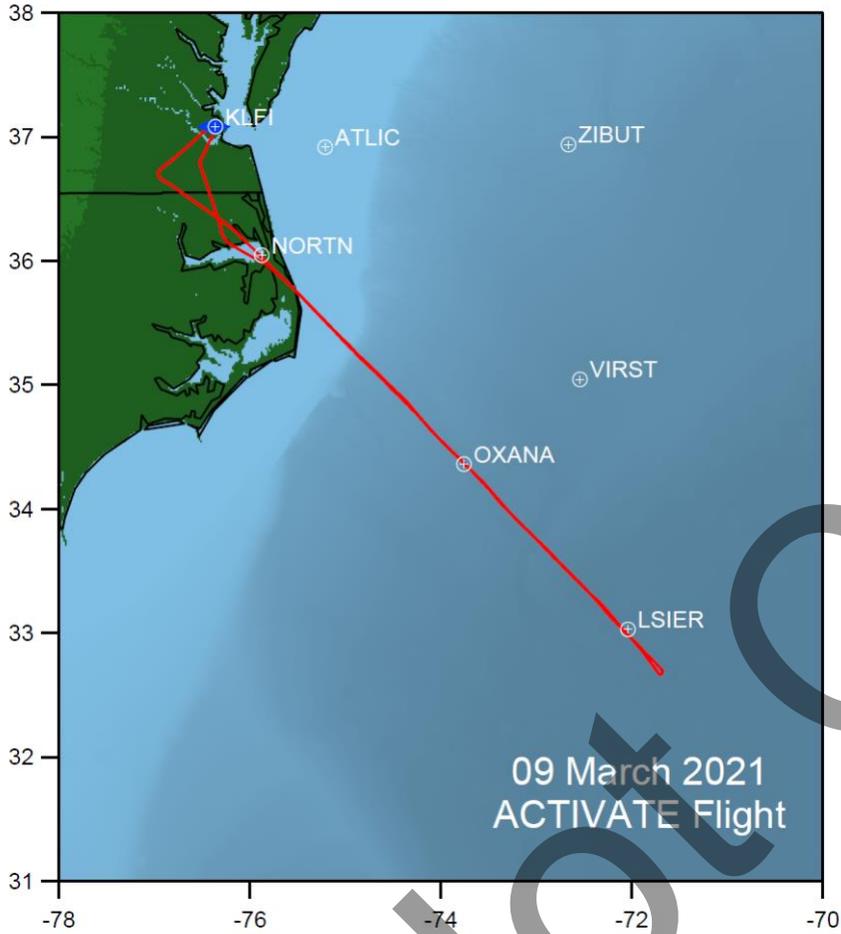
Pilot report (Luke Delaney): Science flight for the HU-25 in support of ACTIVATE Campaign #3, conducted cooperatively with the UC-12. Departed Rwy26 to FKN climbing to 9k ft MSL for wind calibration run setup. Conducted four runs (265/230/200/250 KIAS) while transiting from KLF1-FKN-ECG, all with > 2min stable time (+/- 1 KIAS) and winds out of the northwest (~30 kts). Descended out of 9k ft MSL passing ECG, and worked clear air collection effort from 500 – 5500 ft MSL while transiting out to OXANA. Encountered a scattered layer at ~4200 ft MSL while transiting from OXANA to 3245N/07145W and back, conducting in/out of cloud collection in accordance with standard profile. Continued with clear air profile until reaching the coastline and then proceeded VFR 1000-1500 ft MSL from ECG to KLF1 for a full stop landing... with a quick pass through an intercoastal grass-burning smoke plume. Geolocation was within ~25 nmi throughout flight duration and winds at lower altitudes were from the northwest <10 kts. All objectives were achieved and no system discrepancies were noted - pending post-flight data analysis.

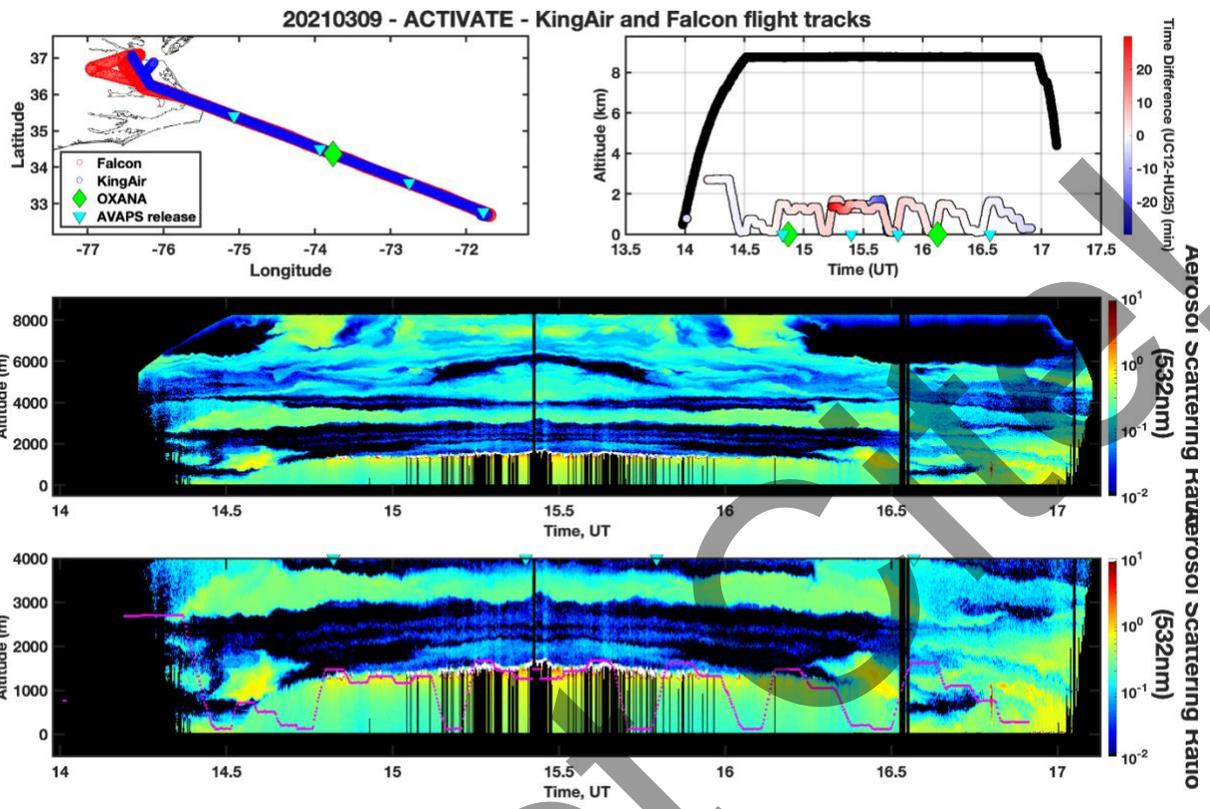
Pilots: Thorson/Delaney QNCs: Crosbie/Winstead

Flight scientist report (Ewan): Performed winds calcs as briefed. 4 speeds (265, 230, 200, 250 kts IAS) all at 9000ft. This was concluded at the time of crossing the OBX shoreline.

Transitioned into clear modules. Shallow MBL near the shore with structure. About 20mins offshore or so the layer deepened quickly and the second module was much deeper (~4000ft). Proceeded with standard cloudy modules once clouds appeared. Cloud layer was very thin although to the east it was more uniform and the inversion was very sharp resulting in an altitude for cloud tops that was easily definable. Overall it was quite an easy day to fly. Only the smallest amount of CW in 1 sample, perhaps enough to run IC. On return performed clear sampling to the shore and did an extended profile up to 5500ft well above the MBL top to probe smoke that was indicated by HSRL. The smoke layer appeared to be shallow by that point and around 3500ft. We saw evidence of NPF in the layer above and ran a 3min leg, a 3min leg in the smoke and then visually identified a fire plume over the scrubland of the OBX, so proceeded to penetrate the plume at 2800ft. Returned the remainder at 1000-1500ft to get a long low level aerosol transect.

Referring to HSRL figure: the structure observed in the shallow marine layer at ~14.30 and also the HSRL managed to capture nicely our penetration through the brush fire at ~16.45-16.50!





Photos courtesy of Eddie Winstead:

DONOR



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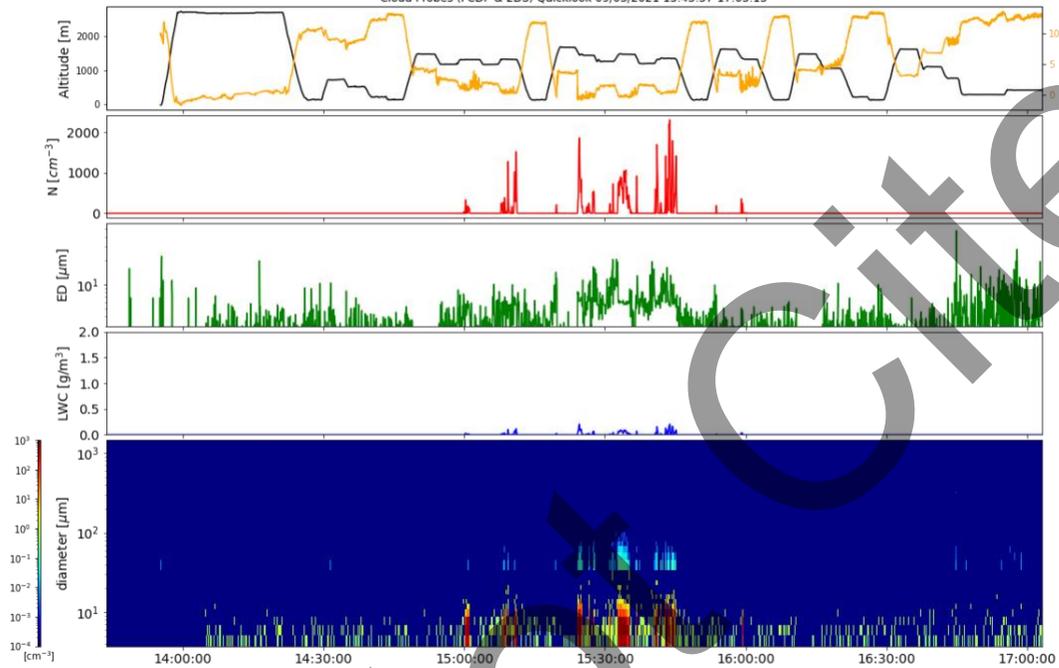
# Quicklook ACTIVATE Cloud Probes (FCDP & 2DS) Quicklook

preliminary data, only for quicklook use

Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie



Cloud Probes (FCDP & 2DS) Quicklook 09/03/2021 13:43:37-17:03:13



Simon.Kirschler@dlr.de, Christiane.Voigt@dlr.de, richard.moore@nasa.gov, ewan.crosbie@nasa.gov

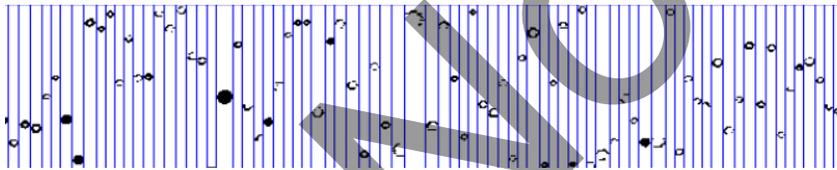
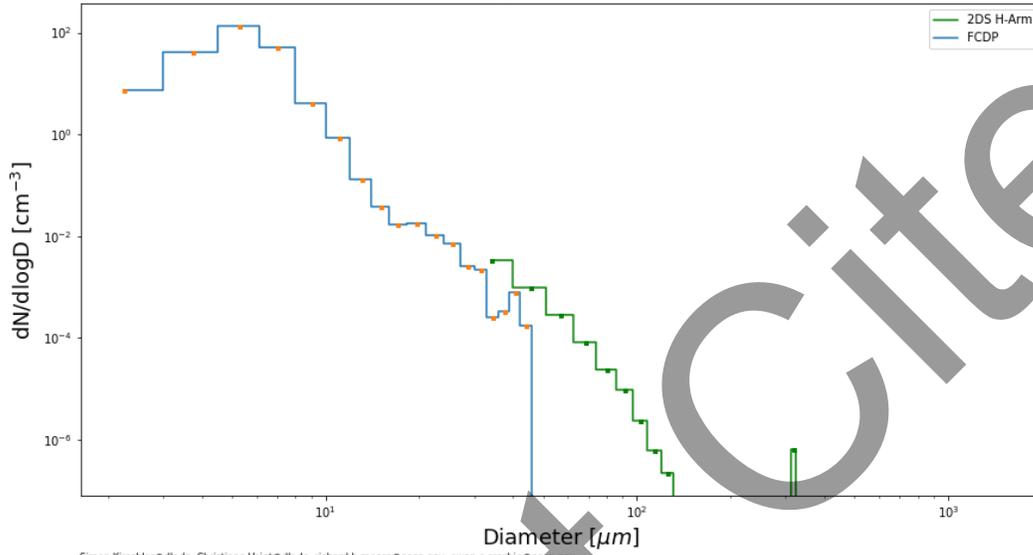
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# PSD ACTIVATE

preliminary data, only for quicklook use  
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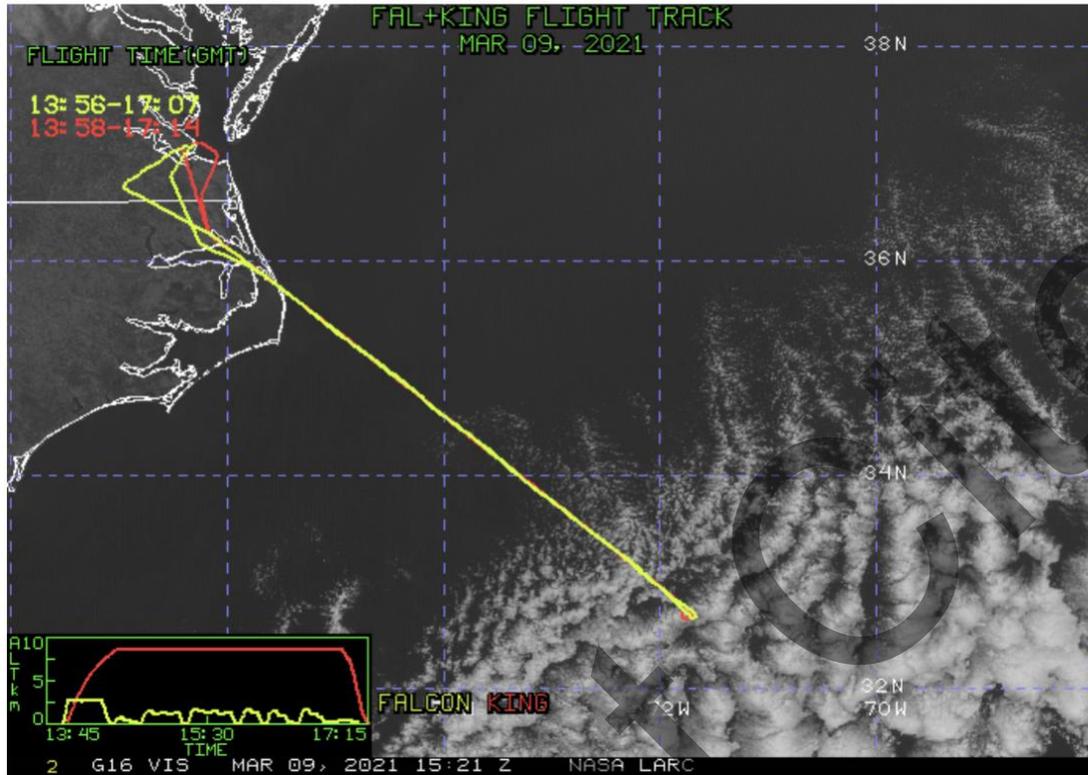


PSD 09/03/2021 13:43:37-17:03:13



Only pure liquid clouds

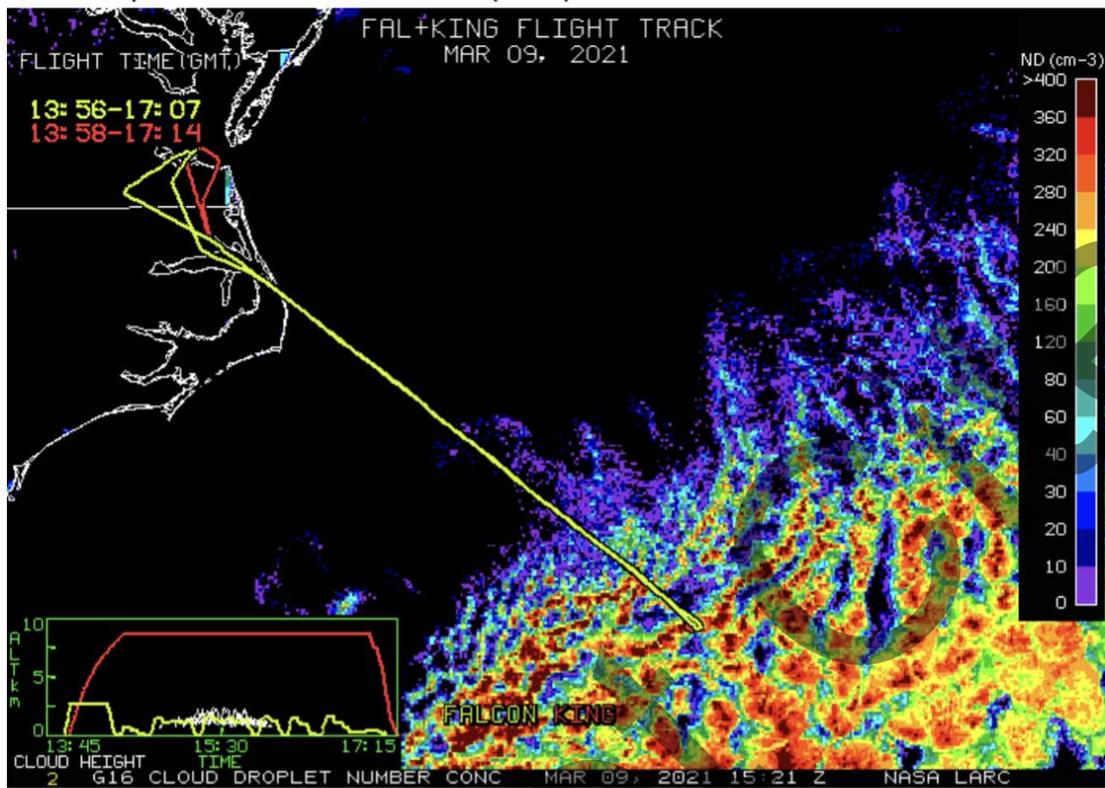
NASA-LaRC Clouds Group GOES-16 Quicklook Images for Flight 52, 15:21 UTC Mar 09, 2021  
Visible Image



Cloud Phase



Cloud Droplet Number Concentration (cm-3)



Cloud-Top Height (Kft-ASL)

